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Report to

STAKEHOLDERS

<http://www.edwards.af.mil/penvmng/index.html>

Air Force tests whey to destroy solvent at Site 19

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With the theme "It all comes back to you," America Recycles Day kicked off a national campaign to highlight recycling's recurring benefits.

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Environmental Support Zones Program helps Edwards Air Force Base workers to better understand compliance regulations.

The Air Force is performing a pilot test for *in situ* bioremediation, using an organic material, whey powder, which will be injected into the subsurface to promote the destruction of trichloroethene (TCE) in groundwater at Site 19. TCE is a chlorinated hydrocarbon commonly used as a solvent to clean grease from metal parts.

Site 19 is the former testing facility for the X-15 and other aircraft. The site is located northeast of the Main Base flightline.

During aircraft testing in the 1960s and 70s, wastewater containing solvents was discharged to a soil catchment basin; this is the suspected source of a large TCE plume in groundwater below the ground surface at the site.

The maximum TCE concentrations in the study area at the site are about 7,000 parts per billion (ppb). The regulatory limit for TCE is 5 ppb.

Whey powder, a dairy product that is a mixture of lactose (a type of sugar) and protein, has been shown to stimulate bioremediation of TCE in laboratory studies and in field demonstrations.

During the study, whey powder is mixed with potable water. The resulting solution is then injected into the groundwater aquifer through two injection wells. Approximately 9,600 gallons of whey powder solution will be injected at a time into each well. Ten monitoring wells surrounding the injection wells are periodically sampled and the samples

See *Whey*, page 6



WHEY TO GO — Gary Mecham, engineering department manager for contractor North Wind, opens the hopper hatch to allow dry whey powder to enter the system.

Earth Day craft contest for schools begins this month

Edwards Air Force Base Environmental Management is sponsoring a recyclable craft contest for Earth Day 2006, nationally celebrated on Apr. 22.

Students from Boron, California City, Edwards, Lake Los Angeles, Lancaster, Mojave, North Edwards, Palmdale, Quartz Hill, Rosamond, Tehachapi or any Antelope Valley community are invited to participate.

Submissions should be a craft made of recyclable material, such as plastic bottles, aluminum cans or newspaper. Entries will be judged on the level of creativity in reusing these types of recyclable materials. The craft can be any three-dimensional useful object. Some examples include picture frames, piggy banks or bird feeders.

Age categories for the contest are: Category I, kindergarten through Grade 3; Category II, Grades 4 through 6; Category III, Grades 7 through 9; and Category IV, Grades 10 through 12. Submissions cannot be larger than 12 inches long by 10 inches wide by 10 inches tall; cannot have sharp objects or edges; and need to be clean and transportable. The student must complete all work on the

recycled craft.

Winning entries in each category will be displayed in the Environmental Management lobby. From the winning entries, one overall best recycled craft will be photographed and incorporated into a poster distributed throughout the base to increase awareness of Earth Day. The winning student's class will be invited to the base for a special tour and a pizza party.

Environmental Management must receive entries no later than noon Feb. 27. All entries must include the student's name, address, phone number, age, category, teacher's name and school name. Home-schoolers are also encouraged to participate. For those with base access, entries may be dropped off at the Environmental Management Office at the corner of Rosamond Boulevard and Popson Avenue. Submissions may also be mailed to: EM Earth Day Craft Contest, 5 E. Popson Avenue, Bldg. 2650A, Edwards AFB, CA 93524-8060.

Nonwinning entries may be picked up at Environmental Management through May 1.

RTS

Next RAB Meeting

Feb. 16, 2006

5:30 p.m.

North Edwards

Location To Be Determined

The public is invited.

If you have a question about the Edwards Air Force Base Environmental Management program, you may address it to Stakeholders Forum, Attn: Gary Hatch or Miriam Horning, 5 E. Popson Ave., Edwards AFB, CA 93524-8060, or send e-mail to: gary.hatch@edwards.af.mil

Report to Stakeholders is a publication of the Edwards AFB Environmental Management Division. Its purpose is to inform and educate the public, base workers and residents about continuing Environmental Management efforts at Edwards AFB. It currently has a circulation of 6,000, including about 2,000 subscribers.

Contents of the *Report to Stakeholders* are not necessarily the official view of, or endorsed by, the U.S. government, the Department of Defense, or the Department of the Air Force.



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Report to
STAKEHOLDERS



America Recycles Day

SORTING — The Edwards Air Force Base Recycling Center, located at the landfill, collects recyclables, sorts them out and eventually compacts them into bales to prepare the materials for sale to a recycler.

To Milt Riley, recycling is like good karma – when you make the effort to recycle, good things always come back to you.

While the base has made solid strides in its recycling efforts, it can do better – in some instances, much better – at recycling, said Riley, the qualified recycling program manager, 95 Air Base Wing Civil Engineering Directorate.

“The good news is the base already recycles tons of material – 590 tons last year alone,” Riley said. “But we can greatly improve on that with everyone’s help.”

Environmental Management (EM) sponsored a poster contest for elementary school students on base and had a traveling recycling display that began a basewide tour at the Base Exchange last November.

The types of material that can be recycled include cardboard, aluminum cans, plastic and glass containers and several types of paper, including white, colored and newsprint.

“Every item we recycle saves that much space in the landfill. In addition, each

item will be remanufactured into a useful product we can find in the marketplace,” Riley said.

This brings him to a point that sometimes gets lost in discussions about recycling. To complete the cycle – the cycle of recycling – people need to buy products made from recycled materials, he said.

There are three parts to the recycling process – collecting, remanufacturing and buying. Each of these steps is represented by one of the three arrows in the recycling logo and each step needs to be present for the recycling process to work.

“It helps when people look for and purchase products made with recycled materials,” he said. “As more people make a point to purchase recycled products, manufacturers will have a greater incentive to continue to produce these products and the system will thrive.”

Edwards supports the purchase of recycled products through the Green Procurement Program, a Department of Defense Program that encourages the purchase of environmentally preferable

products and services. These products include, but are not limited to: paper products, general office supplies, picnic tables, copier and printer toner cartridges, and both wood and plastic pallets.

America Recycles Day is a national campaign begun in 1997. The theme for last year’s event was “It all comes back to you.”

There were two winning posters from each grade in the elementary school poster contest. The posters were reproduced in a calendar for this year’s America Recycles Day.

In addition to recyclables, there are also hazardous materials that must be diverted from the landfill wastestream – motor oil, batteries, lead-acid batteries, fluorescent bulbs, used refrigerators, used televisions and used computer monitors. For more information to safely dispose of these materials, base residents and workers should contact EM at 277-1401, the base U-Fix-It store at 277-2550, the landfill at 277-DUMP, or the Auto Hobby Shop at 275-2886.

Environmental Support Zones Program helps base workers better understand and manage regulations



VERIFICATION

An Environmental Resource Specialist works with a civilian employee at Edwards Air Force Base making sure that hazardous waste bins are labeled and marked correctly.

Launched early in 2004, Environmental Support Zones — with their associated Environment Resource Specialist (ERS) staff members — have succeeded in helping base workers better understand and manage the handling and reduction of hazardous waste in compliance with environmental regulations for air, water and the soil.

“To date, Support Zones have demonstrated success in the increased number of people participating in the program, greater knowledge about environmental requirements and procedures spread across a spectrum of base workers, and avoidance of delays in permitting new equipment and processes,” said Robert Wood, chief Environmental Management Division. “All this has been done without delays to projects that are part of the Air Force mission.”

Such a smooth transition can certainly qualify as a success given that it involved something as major as turning environmen-

tal compliance inspectors into consultants,” Wood said.

Before Support Zones were established the compliance staff used to catch employees doing something wrong, then write them up and expect them to develop their own corrective action.

“One of the problems with this old way of doing things was that most employees had no idea they were doing something wrong,” he said. “So rather than being compliance enforcers, now the compliance staff teach, mentor and assist the customer to come into compliance and stay in compliance.”

This big, but needed, change was preceded by a question: Does the customer want a compliance audit, or to come into compliance?

“In the words of W. Edwards Deming, a World War II leader of the Quality Revolution in the U.S. and Japan, ‘dependence on inspection to achieve quality doesn’t work,’” Wood said.

“Rather than policing through inspections, environmental specialists are now primarily consulting with and training base personnel,” he said. “This gives them the knowledge and database tools required to build quality from the get-go. Is that a better way to do things? You bet!”

“Environmental Resource Specialists assigned to each of seven Support Zones across Edwards Air Force Base are available for day-to-day environmental compliance support and can be relied upon to make intelligent recommendations affecting any organization’s projects,” Wood said.

These specialists are stationed at locations with recurring inspection requirements or places where environmental support is required. They become familiar with specific organizational functions and needs within their zone by attending meetings and functions that keep them current, and that make them available for day-to-day consultation and support. They also provide training

and maintain databases to track various environmental regulation processes as they apply to a particular organization or shop.

Additionally, the specialist assigned to a zone assists with project planning. New projects are reviewed for National Environmental Policy Act (NEPA) compliance using an in-house Environmental Impact Analysis Process (EIAP). Because the specialist's assistance precedes submittal of a project evaluation request, often the specialist can help prepare the EIAP request and communicate the real project requirements to the review staff.

Although these resource specialists serve primarily in a consultant role, the need for inspection continues.

But even inspections have taken on something of a new face with the cross-utilization of environmental specialists.

"Routine and reoccurring inspection requirements are more efficiently handled by multimedia 'journeymen' rather than numerous inspections by single protocol 'experts,'" Wood said. "From a simple

manpower perspective cross-utilization makes total sense. But it's the Big Picture we're after here and people are more apt to get it when they step outside their area of expertise in things like air or hazardous waste to perform inspections beyond that single protocol."

Another advantage of the Support Zone is the immediate feedback it provides. Each zone prepares and submits weekly activity reports to Environmental Management (EM). Any issues and problems that may arise are discussed with shop personnel at that time. A summary is presented to the organization managers at monthly meetings and "lessons learned" from internal assessment and management of environmental, safety and occupation health compliance are monitored for closure.

Technology to support inspection and compliance adds value to the effort. To track inspections, maps showing building numbers and inspection status have been created using EM's Geographic Information Systems (GIS).

A portable data device used in the field lets the resource specialists integrate inspection results and maintain more accurate records. Data is collected and information entered on a specially-designed Zone Tablet to record infield inspections, inspection results, meeting notes, diagrams and all office capabilities. With this wealth of information stored in EM's database, the specialists have the ability to reconcile field records with a master database and provide mobile copies of permits, regulations, maps and data, including emissions, fuel records and paint logs, to anyone requesting this information within their zone.

Information gathered in all these efforts is making it possible to live up to the Support Zone's initial promise, Wood said. "The entire toolkit is new and improved so we can hear about and understand the environmental problems that are most important to our customers and then provide the best solution along with the expert help it takes to get things done right the first time."

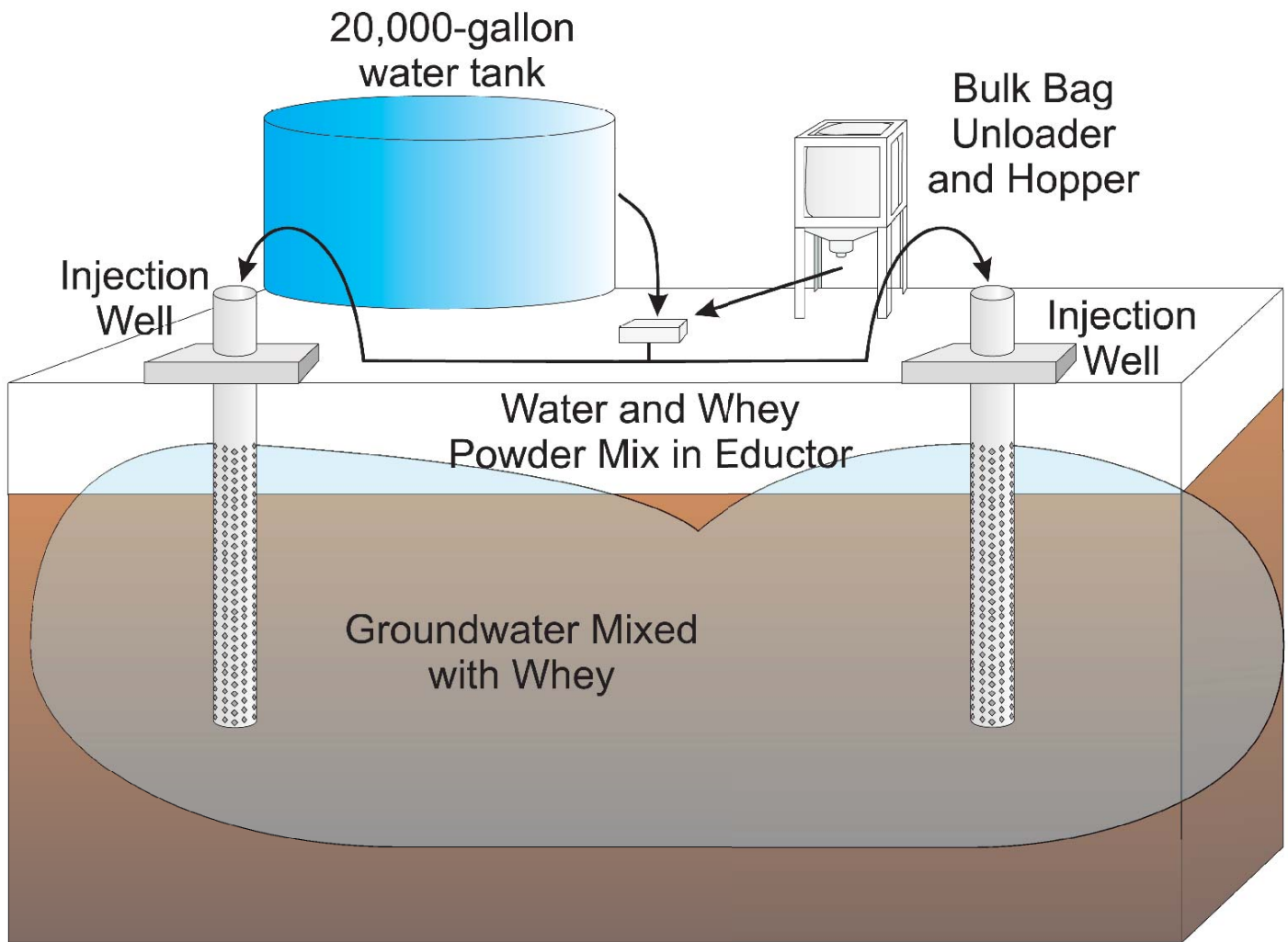
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FISCAL YEAR 2005

Compliance Sites	2004	2005	
		Semiannual (first half)	Semiannual (second half)
Underground Storage Tanks	16	16	8
Aboveground Storage Tanks	72	70	74
Resource Conservation and Recovery Act Cleanup Sites	5	5	5
Drinking Water	62	62	62
Waste Water/Storm Water	89	89	89
Emergency Planning and Community Right to Know Act	237	237	235
Air Sources	2,132	1,959	1,956
Hazardous Waste Storage Sites	82	81	78
Pesticide Facilities	0	0	0
Open Burn/Open Detonation Facilities	4	4	4
Permitted Solid Waste Landfills	1	1	1
Number of Sites	2,700	2,524	2,512

BIG JOB — In fiscal 2005, there were over 2,500 sites included in the Environmental Support Zone effort ranging from sites with underground storage tanks, to open burn/open detonation facilities, to permitted solid waste landfills. But the majority — nearly 2,000 of the total sites — were ones where environmental control of air sources were concerned.

Diagram of Site 19 Whey Powder Injection



STEP-BY-STEP — This diagram shows the process the cleanup technology will take at Site 19 using whey powder. First, a potable water supply is used to fill tanks prior to injection, and as needed during the injection. Second, the flow rate is controlled by pumping potable water from the tank during injection at approximately 20 gallons per minute (gpm). Third, powdered whey is removed from bulk bags and specific doses are mixed in the injection line using a metered screw feed, hopper and eductor. Lastly, about 10 gpm of whey solution (or suspension) is injected down each well.

WHEY

From page 1

are analyzed by a laboratory to track the progress of TCE bioremediation.

The whey powder stimulates the destruction of TCE by microorganisms already present in the subsurface through a process called anaerobic reductive dechlorination (ARD). This process occurs in subsurface environments where there is no oxygen, known as anaerobic

conditions. The ARD process requires that a sufficient quantity of a suitable nutrient, such as whey powder, is available to the microorganisms.

As the microorganisms metabolize the nutrient, they produce hydrogen atoms. If oxygen is present, two hydrogen atoms combine with an oxygen atom to form a water molecule. If no oxygen is initially

present or all of the available oxygen has been converted to water molecules, the hydrogen atoms will replace the chlorine atoms of the TCE molecules, dechlorinating and ultimately converting the TCE into harmless chemicals. The displaced chlorine atoms combine with various atoms present in the groundwater to form harmless salts.

RAB Meeting Highlights

The following report highlights the latest quarterly meeting of the Restoration Advisory Board (RAB) held Nov. 17, 2005 in Boron, Calif.

/// **Remedial Project Manager (RPM) John O'Kane Attends His Last Restoration Advisory Board Meeting** — Department of Toxic Substances Control (DTSC) Remedial Project Manager John O'Kane attended his last RAB meeting in November 2005. For his service and time as an RPM with the Environmental Restoration Program at Edwards Air Force Base, O'Kane was presented with a plaque at November's meeting. Before the base was added to the National Priorities List in 1990, O'Kane was already deeply involved with the program, beginning as a member of the Technical Review Committee, or as it is now known, the RAB. O'Kane will be replaced in the interim by DTSC Supervisor Charles Ridenour.

/// **Introduction to the Military Munitions Response Program** — Environmental Management introduced a plan to identify and clean up unexploded ordnance, discarded munitions and munitions chemical residue in areas known to potentially have been used for bombing and gunnery activities since the 1930s. Labeled the Military Munitions Response Program (MMRP), the goal of this nationwide Department of Defense initiative is to make land used for prior military activities safe for reuse. The Edwards Air Force Base MMRP is expected to run past 2011 and will follow the same cleanup process as the Environmental Restoration Program, which is managed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

/// **Update of the Record of Decision (ROD) Schedule** — There were a few updates to the Record of Decision (ROD) schedule. Combining the operable units in the northern portion of the base, the newly designated Operable Unit 5/10 will go under one ROD. The MMRP joins the ROD schedule but will not have an estimated completion date until the scope of the program is determined. Funding cutbacks delayed many of the ROD dates for the operable units; nearly half are not expected to be finished until fiscal year 2009. Environmental Management and its regulators are collaborating on a streamlined process to reduce the amount of time it will take to complete each ROD.

The next meeting of the RAB will be at 5:30 p.m. on Feb. 16, 2006 in North Edwards, Calif. The location is to be determined. The public is invited to attend.

RTS

Environmental Management saves cactus, placing it on landscape plot



NEW ADDITION — From left, a barrel cactus sits at the former Base Housing Area F. The area is undergoing reconstruction and before the house was bulldozed Environmental Management wrapped the cactus. The 95th Civil Engineer Directorate then helped haul it and Natural Resources prepared a place for it on Environmental Management's landscape plot where it currently sits, far right.

Environmental Management (EM) saved a barrel cactus from former Military Housing Complex Area F before the house it was sitting near was bulldozed for reconstruction of the entire housing area.

During a routine asbestos inspection, JT3/CH2M HILL employee Jennifer Martin noticed the cactus and made a call to Natural Resources. With the assistance of the 95th Air Base Wing Civil

Engineering Directorate, the barrel cactus was transported to EM's landscape plot last October.

Barrel cacti are perennial, meaning they are active throughout the year and can live to be over 50 years old. The species is native to southwestern deserts of the United States and Northern Mexico.

Blooms can be seen from the months of July to September, but can start earlier. The fruits of barrel cacti ripen in October or November.

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Published data and documents relating to the Environmental Restoration Program are available for public review in information repositories at four locations. The current information repositories are located in the cities of Boron, Lancaster and Rosamond, as well as Edwards AFB. They are updated when new documents are released.

If you have any questions about information in the repositories, please contact Gary Hatch, Environmental Public Affairs at (661) 277-1454 or through e-mail at gary.hatch@edwards.af.mil.

**Location****Days and Hours of Operation****Edwards AFB Library**

5 W. Yeager Blvd.
 Building 2665
 Edwards AFB, Calif.
 (661) 275-2665

Mon-Thurs 9:30 a.m. - 7 p.m.
 Fri 9:30 a.m. - 6 p.m.
 Sat & Sun 10:30 a.m. - 6 p.m.

Kern County Public Library

Wanda Kirk Branch
 3611 Rosamond Blvd.
 Rosamond, Calif.
 (661) 256-3236

Tue & Wed Noon - 8 p.m.
 Thurs-Sat 10 a.m. - 6 p.m.

Los Angeles County Public Library

601 W. Lancaster Blvd.
 Lancaster, Calif.
 (661) 948-5029

Mon-Wed 10 a.m. - 8 p.m.
 Thurs & Fri 10 a.m. - 5 p.m.
 Sat 11 a.m. - 5 p.m.

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